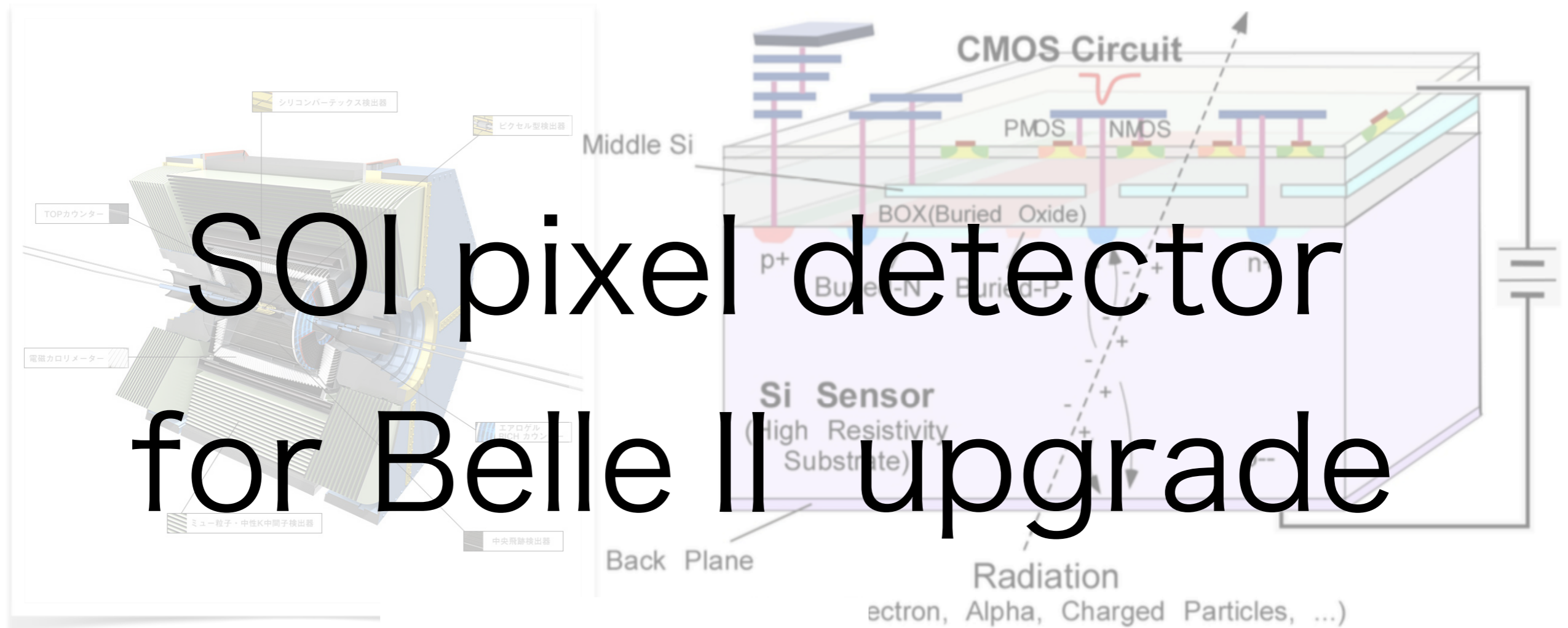


GPPU progress report



Taohan Li
D2

SOI Pixel detector for Belle II upgrade

Pixel detectors (PXD) in Belle II, is required to measure the two B decay vertices by reconstructing tracks with strip detectors (SVD).

↓ Upgrade (5 times larger luminosity)

For PXD

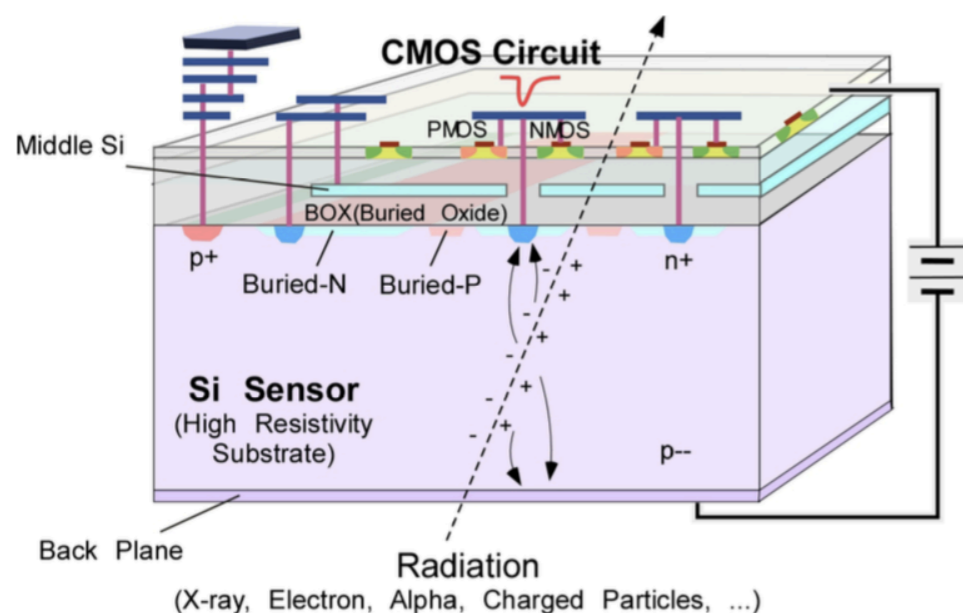
Hit rate **113 MHz/cm²**

Radiation hardness **0.5 MGy / year** **2.5×10^{14} n_{eq}/cm²/year**

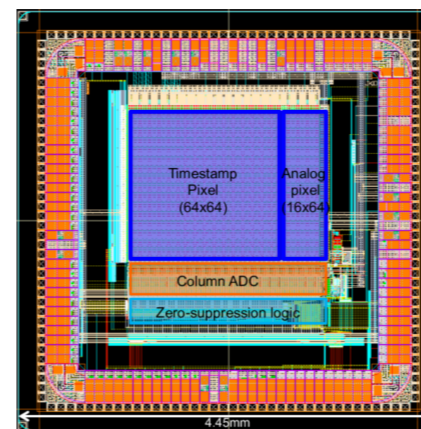
High readout speed **trigger rate 30 kHz**

Occupancy **$O(10^{-14})$**

KEK SOPIX group develops a pixel detector for Belle II upgrade PXD.



SOI structure



SOI pixel detector for ILC

My research in GPPU

Development of SOI pixel detector for Belle II upgrade.

Design

Chip design :
Analog circuit
Digital circuit
peripheral circuit

Geant4
simulation study

SOI sensors test

MPW run(Multi-project wafer)

Prototype chip completed

Evaluation

Beam test preparation

Beam test

Electric test

Infrared laser test

Version up
design

Present status

Present status

Got interesting simulation results

Start Digital design

PXD(pixel detector in Belle II) is required to measure the two B decay vertices.

→ Decide what performance of pixel detector we should develop

- Occupancy
 - Spatial resolution
 - Time resolution

- Radiation hardness

→ What pixel circuits do we should design?

- Analog circuits
- Digital circuits
- Readout circuits

Geant4 simulation

My work

Verilog

Overseas training in GPPU

2020 Apr. ~ 2020 Oct. France . Strassbourg

IPHC (Institut Pluridisciplinaire Hubert CURIEN)

Why I choose IPHC?

They also develop pixel detector for collider experiment, and they are collaborating closely with KEK SOI group.

Homepage (almost written in French) : <http://www.iphc.cnrs.fr/-PICSEL-.html>

DRS | Recherche au DRS » Du Big Bang aux particules » **PICSEL**

PICSEL

Physics with **I**ntegrated **C**mos **S**ensors and **E**lectron machines

► CMOS Sensors

- Principle of operation
- CMOS Sensors and their applications
- Publications and presentations
- List of CMOS chips
- Pictures of CMOS chips
- Beam telescope
- TAF package

What can I do in IPHC?

- Studying on CMOS sensors.
- Learning how to design CMOS sensors.
- Test CMOS sensors.
- There are much more students to communicate than SOI group.